



PSM PRESENTATION

Engineering Process and

Tools Organization (EP&TO)

Cost-Effective Process Modeling & Simulation Using the Balanced Scorecard & Raytheon Six Sigma Methodology

July 18, 2003

Seventh Annual PSM Conference

Keystone, Colorado

Dr. Aaron N. Silver

(720) 858-5258

ansilver@raytheon.com



PROCESS MODELING



COST EFFECTIVE PROCESS MODELING & SIMULATION USING THE BALANCED SCORECARD & RAYTHEON SIX SIGMA METHODOLOGY

Dr. Aaron N. Silver
Raytheon Systems Company
IIS: Intelligence & Information Systems
Denver Site Operations
Engineering Process & Tools Organization (EP&TO)
16800 East CentreTech Parkway
Building S77, M/S 3026
Aurora, CO 80011

Phone: (720) 858-5258 Fax: (720) 858-5953



BALANCED SCORECARD





Strategic Objective

 Growth Orientation Financial Strength

Measurement

Negotiation metric

Cash Revenue -2004 Margin Annual growth ROIC

Strategic Objective

- Process Improvement
- Integrated Planning & Forecasting
- FEOTB Market, Capture, **Propose**
- Develop Business Solutions / Products & Services

Measurement

Defect Rate ROI on Improvements Productivity Improvement (O/H)

% Functional Groups in Plans Performance to Plan

Funnel of Opportunities Balance of Business Portfolio Capture Rate RÓIC

Product Development Cycle Time % License & Maintenance Fees / Sales



Strategic Objective

Meet Commitments. **Expectations** Easy to do Business with

Gate 5 reviews

Composite award fee SPI **CPI**

 Protect, Expand, Diversify Customer Base

Measurement

of New Acquisition Sources Market Share

Strategic Objective

 Share Best Practices and Lessons Learned

- Focused People Strategy
- Skill Development
- Investment People, Assets, Technology

Measurement

Build / Reuse Ratio Gate II Completion

Strategic Job Coverage Ratio # Successors / Critical Positions Retention Rate

Critical Skill / Need Ratio **Skill Training Plan**

Performance to Plan

Targeted R&D to Sales Actual R&D to Sales ROIC



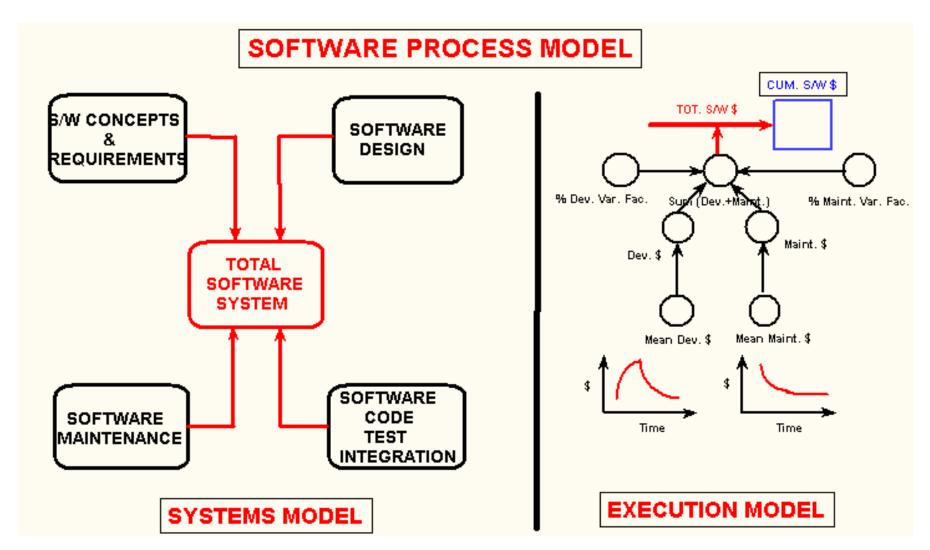






Command, Control, Communications

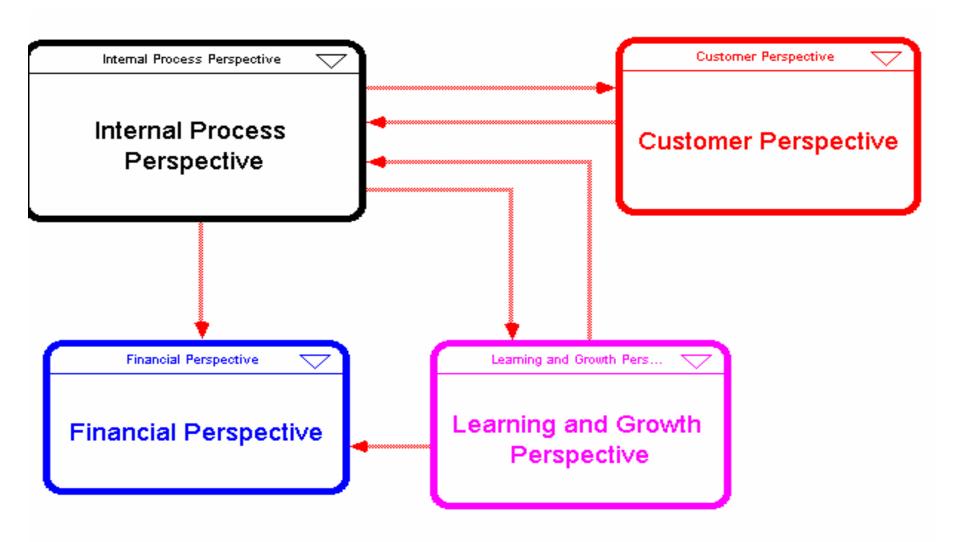
BALANCED SCORECARD SIMULATION Information Systems



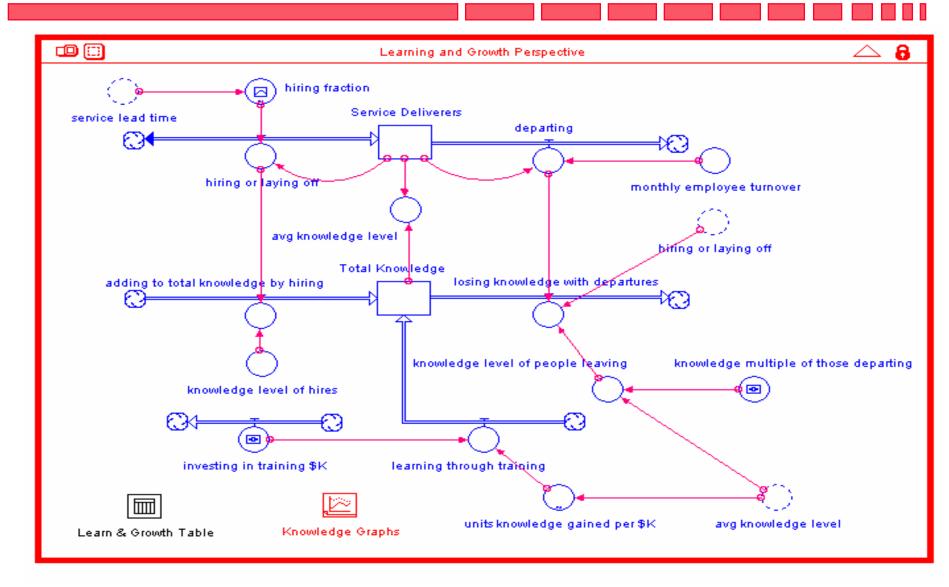


BALANCED SCORECARD TOP LEVEL MODEL

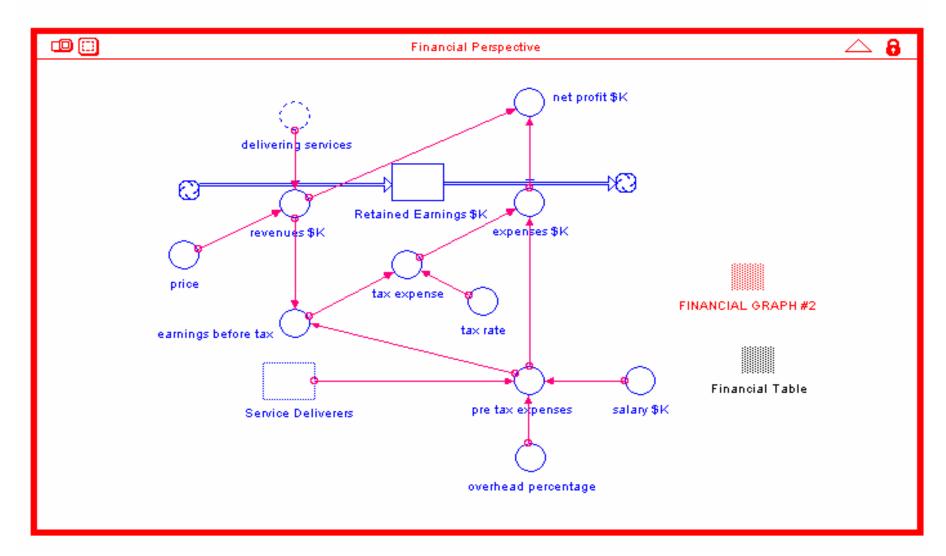






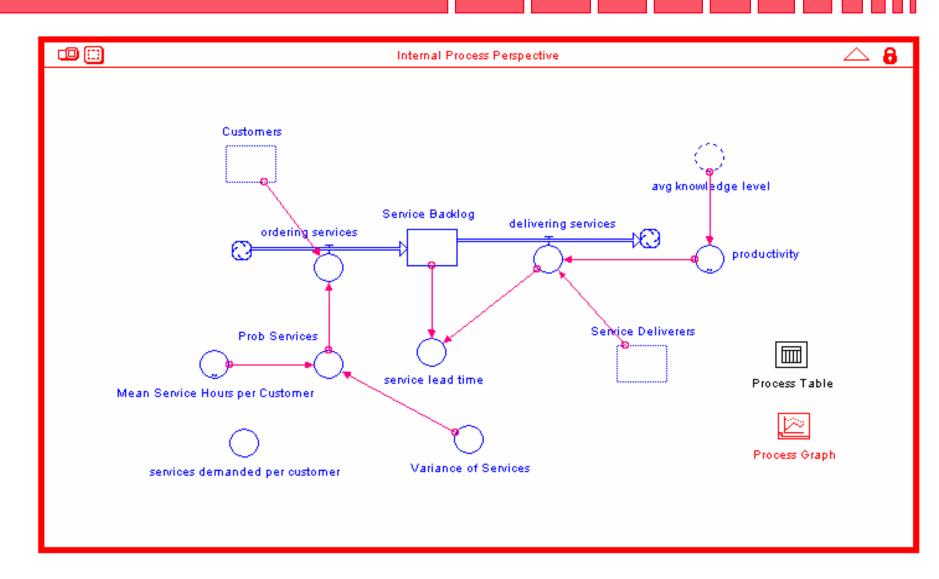






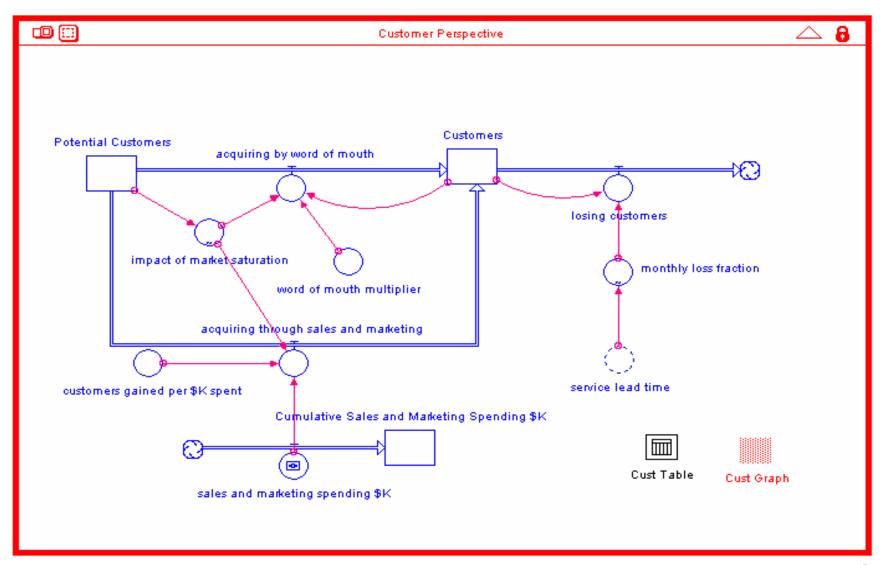








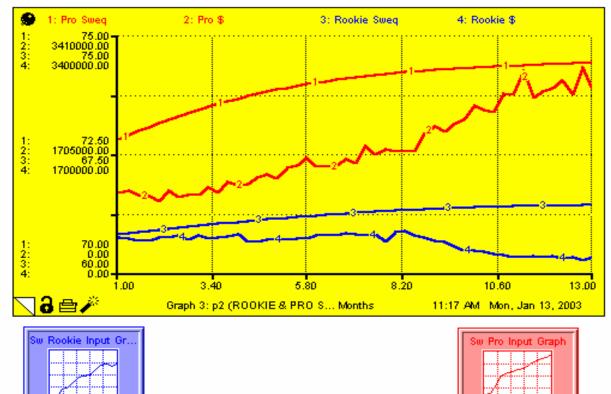






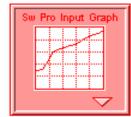
BALANCED SCORECARD SIMULATION OUTPUT

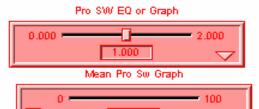










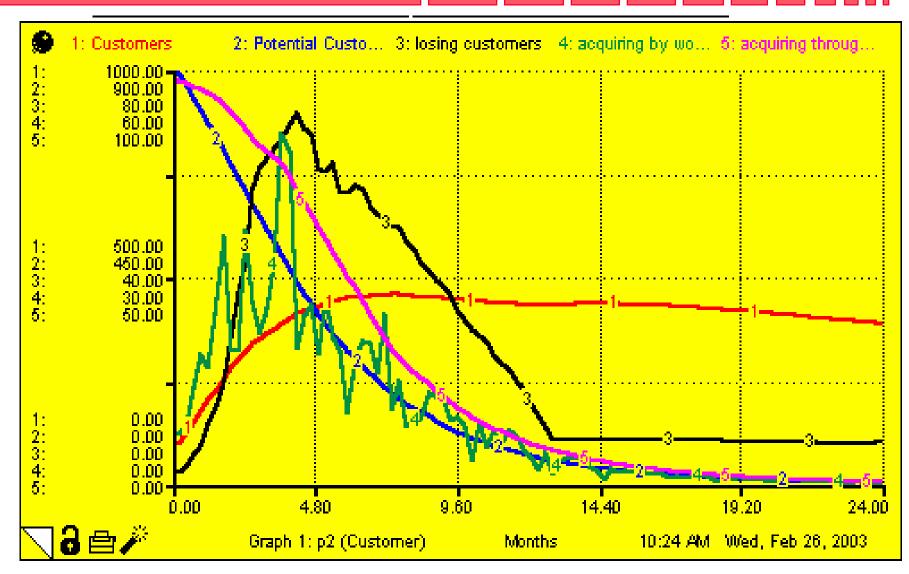


egn on



BALANCED SCORECARD SIMULATION OUTPUT

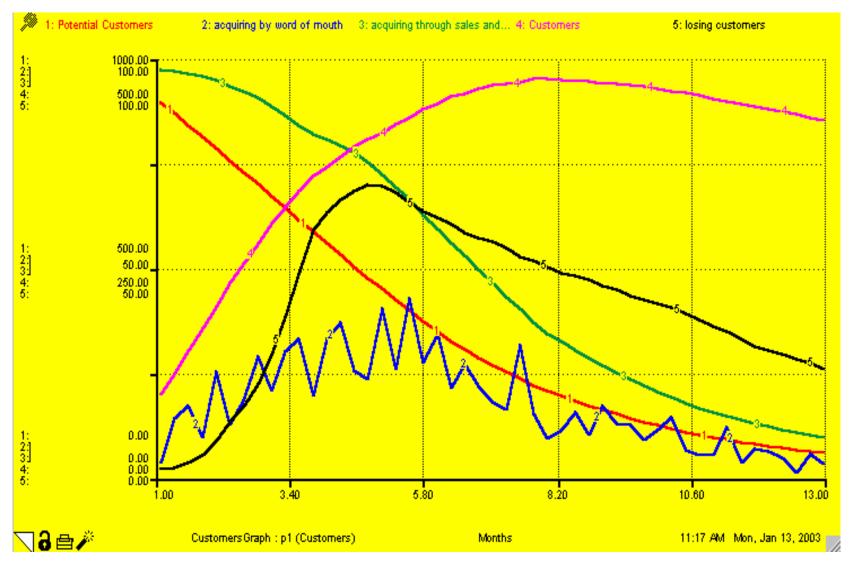






BALANCED SCORECARD SIMULATION OUTPUT

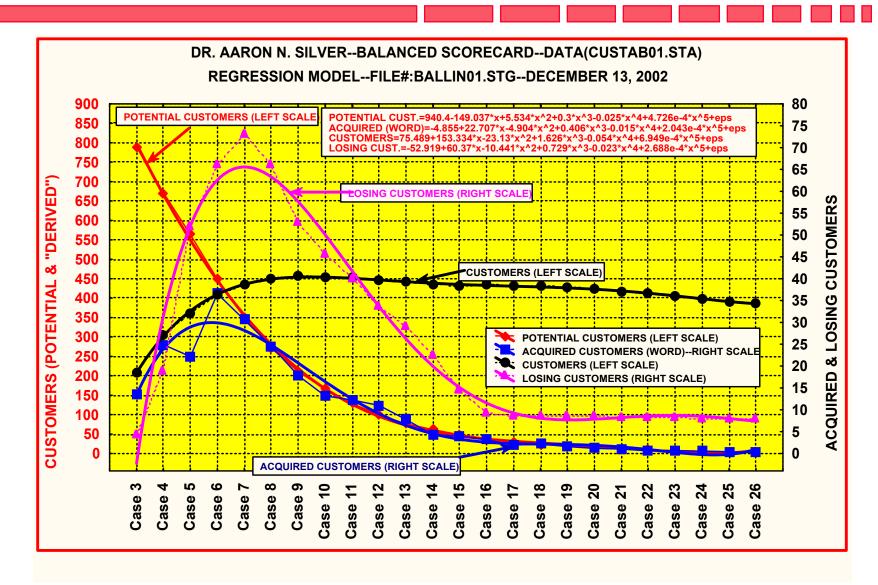






BALANCED SCORECARD SIMULATION ANALYSIS







BALANCED SCORECARD "OPM" OUTPUT

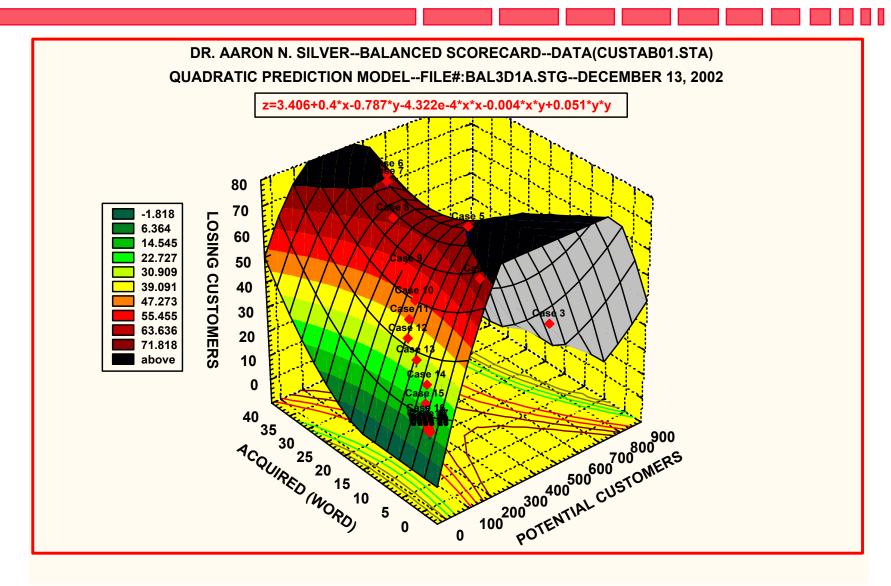


1																		
Performance		Engineering Center Summary															6-May-03	
The land of the	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16		
X X	People	Customer	Customer	Customer	People	Productivity	Productivity	Productivity	Productivity	People	People	Productivity	Customer	Productivity	Customer	0		
Stretch Goal Stre	Staffing	Engr. Direct Labor	Labor Utilization	Enginearing OH	Training	IPDS Deployment	Gating Execution Status	Measurement Maturity	Process Capability Maturity	Communications	Diversity	Six Sigma	QPI	Enginearing Productivity	Partnership (Internal Customers)	Meas 16		
M1 M2 M3 M4 M5 M6 M7 M8 M9 M10 M11 M12 M13 M14 M15 M16 10 <	×	×	×	×	×	×	×		×		×	×	×					
10	5.0	7.0	9.0	10.0	7.0	7.0	7.0	0.0	2.0	0.0	4.0	3.0	6.0	0.0	0.0	0.0	Performance	
9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	M1	M2	M3	M4	M5	M6	M7	M8	M9	M10	M11	M12	M13	M14	M15	M16		
9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10	
8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	Stretch Goal
7	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8		
6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	Goal
4 4										_				6				
3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3																		
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	_		_		_	_	_	_	_	_			_	-				
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1																		Baseline
9% 9% 9% 9% 9% 9% 0% 9% 0% 9% 9% 0% 0% 0% Veighting 100%							_							_			2	
9% 9% 9% 9% 9% 9% 0% 9% 0% 9% 9% 9% 0% 0% 0% Veighting 100%	-		-		-	-		_		-	-	_	-	-			1	
	U		U	U	U	U	U	U	U	U	U	U	U	U	U	U	U	
	9%	9%	9%	9%	9%	9%	9%	0%	9%	0%	9%	9%	9%	0%	0%	0%	¥eighting	100%
0.10 0.01 0.02 0.01 0.01 0.01 0.01 - 0.10 - 0.00 0.21 0.00 30010 0.1	0.45	0.64	0.82	0.91	0.64	0.64	0.64	-	0.18	-	0.36	0.27	0.55	-	-	-	Score	6.1



BALANCED SCORECARD SIMULATION ANALYSIS







BALANCED SCORECARD SIMULATION ANALYSIS



